

WHAT IS CLAIMED IS:

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1. A plug and play computer system, comprising:
 - a) a computer having a visual display and at least one exterior serial bus port for coupling at least one peripheral device to said computer;
 - 5 b) an operating system residing on said computer programmed to dynamically configure the computer system, said operating system having a first subroutine for generating a first internal message indicative of said operating system sensing a change in the number of devices coupled to said computer and a second subroutine for generating a second internal message indicative of said operating system completing a configuration process;
 - 10 c) a configuration notification program residing on said computer for receiving said first and said second messages and creating a visual display for promptly notifying the user when it is unsafe to couple or uncouple a plug and play device to said computer.
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2. The system of Claim 1, wherein said configuration notification program comprises:
 - a message handler residing on said computer, said message handler hooking said first and said second messages, said message handler including a message analyzer unit and a state determination unit arranged to provide a first output signal when the configuration process is in progress and a second output signal when the configuration process is completed; and
 - 20 an indication unit residing on said computer and coupled to the output of said message handler, said indication unit generating a visual display notifying the user when it is unsafe to couple or uncouple a plug and play device to said computer.
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3. The system of Claim 2, wherein said indication unit generates a first display indicating that it is safe to remove or insert a device, a second display corresponding to notification that the configuration process is in progress, and a third display corresponding to notification that the configuration process is complete.
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4. The system of Claim 2, wherein said system utilizes a universal serial bus interface and wherein said serial bus port is a universal serial bus port.

5. The system of Claim 4, further comprising a compound hub and wherein said compound hub is coupled to said port via a universal serial bus cable.

6. The system of Claim 4, wherein said computer includes a speaker and said indication unit generates an audio signal indicative of the status of the configuration process.

7. A computer system for improving the reliability of universal serial bus (USB) interface plug and play peripheral devices, comprising:

a) a computer having at least one USB downstream port;
b) a compound hub having an upstream USB connector coupled to said port of said computer via a USB cable, said hub having at least one downstream USB connector port and at least one non-USB peripheral device port;

c) an operating system with USB interface capability residing on said computer, said operating system generating a first subroutine for generating a first message indicative of said operating system sensing a change in the bus topology and a second subroutine for generating a second message indicative of said operating system completing a configuration process for said bus topology;

d) a message handler residing on said computer for hooking said first and second messages, said message handler including a message analyzer unit and a state determination unit arranged to provide a first output signal when the configuration process is in progress and a second output signal when the configuration process is completed; and

e) an indication unit residing on said computer and coupled to the output of said message handler, said indication unit generating a visual display notifying the user when it is unsafe to remove or insert a plug and play device.

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8. The system of Claim 7, wherein said indication unit generates a first display indicating that it is safe to remove or insert a device, a second display corresponding to notification that configuration is in progress, and a third display corresponding to notification that the configuration process is complete.

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9. The system of Claim 8, wherein said compound hub has a plurality of peripheral device ports for replicating the function of at least one peripheral device port not attached to said computer, whereby the total number of connectors attached to said case is reduced.

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10. The system of Claim 9, wherein said compound hub replicates the function of a mouse port, a serial port, a printer port, and a keyboard port whereby said computer does not require said peripheral device ports.

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11. A method of providing notification of the status of a configuration process of an operating system of a computer coupled to peripheral devices, comprising the steps of:

(a) detecting an event message generated by the operating system whenever the number of the peripheral devices coupled to the computer changes;

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(b) determining if said detection message corresponds to a change in the number or type of said peripheral devices requiring that a user be notified;

(c) notifying the user that a configuration process is in progress;

(d) detecting a completion message generated by the operating system when the configuration process is completed;

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(e) determining if said completion message corresponds to a change in the number or type of said peripheral devices requiring that the user be notified that the configuration process is completed;

(f) notifying the user that the configuration process is complete; and

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(g) notifying the user that it is safe to change the number or type of peripheral devices coupled to the computer.

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12. A method of notifying a computer user of the status of a reconfiguration process initiated by coupling or uncoupling a peripheral device to a computer via a universal serial bus connector (USB), comprising the steps of:

5 (a) providing an operating system that automatically configures the computer whenever a change in the number or type of peripheral USB devices changes, said operating system generating a detection message whenever the number of peripheral devices coupled to the computer changes such that the configuration process is initiated and a completion message when the configuration process is completed;

10 (b) hooking said detection message;

(c) determining if said detection message corresponds to a change in the number or type of said peripheral devices requiring that a user be notified;

(d) notifying the user that a configuration process is in progress;

(e) hooking said completion message;

15 (f) determining if said completion message corresponds to a change in the number or type of said peripheral devices requiring that the user be notified that the configuration process is completed;

(g) notifying the user that the configuration process is complete; and

20 (h) notifying the user that it is safe to change the number or type of peripheral devices coupled to the computer.

13. A method of reducing the frequency of universal serial bus crashes in a computer system comprised of a computer coupled to a compound hub via a USB cable, the method comprising the steps of:

25 a) providing a configuration notification unit having a message handler and an indication unit, said configuration notification unit monitoring internal messages generated by an operating system related to a configuration process, said configuration notification unit providing a computer display output indicating when a configuration process is in progress for a USB device;

30 b) changing the number of peripheral devices coupled to said hub; and

c) waiting until said configuration notification unit indicates that configuration is complete before changing the number of devices coupled to said hub.

θ	$\theta = 0^\circ$	$\theta = 45^\circ$	$\theta = 90^\circ$	$\theta = 135^\circ$	$\theta = 180^\circ$	$\theta = 225^\circ$	$\theta = 270^\circ$	$\theta = 315^\circ$	$\theta = 360^\circ$
σ_{xx}	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) - \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) + \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) - \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) + \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$
σ_{yy}	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) + \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) - \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) + \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$	$\frac{1}{2}(\sigma_1 + \sigma_2) - \frac{1}{2}(\sigma_1 - \sigma_2)\cos 2\theta$	$\frac{1}{2}(\sigma_1 + \sigma_2)$
τ_{xy}	0	$-\frac{1}{2}(\sigma_1 - \sigma_2)\sin 2\theta$	0	$\frac{1}{2}(\sigma_1 - \sigma_2)\sin 2\theta$	0	$-\frac{1}{2}(\sigma_1 - \sigma_2)\sin 2\theta$	0	$\frac{1}{2}(\sigma_1 - \sigma_2)\sin 2\theta$	0